Honeywell

Wireless Dual Discrete Input Transmitter User Manual Europe

868 MHz Band

XYR 5000 Line
34-XY-25-63
Rev. 4
July 2012

Switch Input Transmitter

Models WW591, WW592

Versions 1.70 or later

Important Information for the User

- Changes or modifications not expressly approved by Honeywell may void the user's authority to operate the equipment.
- This device is for mobile and fixed use only (not portable or body-worn). A separation distance of 20cm must be maintained at all times between the antenna and the body of the user and bodies of nearby persons.
- This device has been designed to operate with an antenna having a maximum gain of 9 dBd. Antenna having a higher gain is strictly prohibited per regulations of Industry Canada. The required antenna impedance is 50 ohms.
- To reduce potential radio interference to other users, the antenna type and its gain should be so chosen that the EIRP (Equivalent Isotropically Radiated Power) is not more than that required for successful communication.
- The antenna is factory installed and **MUST NOT** be removed or modified by user.

Honeywell Process Solutions

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Phoenix, Arizona 85027

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About This Document

Revision Notes

The following list provides notes concerning all revisions of this document.

Doc ID	Rel ID	Date	Notes
34-XY-25-63	Rlse. 0	12/05	Initial Release
34-XY-25-63	Rlse. 1	08/06	Updated for version 1.70 software release
34-XY-25-55	Rise. 2	12/06	Added Special Conditions for Safe Use clause
34-XY-25-63	3	5/08	Updated dimensions, control drawings
34-XY-25-63	4	7/12	Battery updates

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1. Introduction

1.1. Using This Guide

This guide is designed to assist in installing, operating, and maintaining Honeywell Model WW591 and WW592 Transmitters. The Guide is broken into sections as follows:

Section 2: Quick Start
This section summarizes what must be done in order to get the device installed, configured, and in operation quickly. However, it does not provide detailed or how-to information to perform the tasks outlined.

Section 3: Installation
This section explains how to correctly wire the Input Switches and ground the Transmitter. Also covered in this section are mechanical installation considerations such as Transmitter placement.

Section 4: General Configuration
In this section general configuration options such as password protection and selecting a user password are discussed. Also covered is the setting of a Transmitter tag name, resetting of all Transmitter settings, and a discussion of the various messages that are displayed on the Transmitter LCD.

Section 5: Configuring the RF Communications
This section covers the setup of the Transmitter RF Communications that allow the Transmitter to achieve communication with the Base Radio. Parameters discussed are the Transmitter RF ID, the RF channel setting and the Baud Rate.

Section 6: Configuring the Sampling and Transmission Rates
This section explains the amount of time between each sample of the process and aids you in selecting the time between each transmission of this sample to the Base Radio. Use of a smart rate is also discussed.

Section 7: Maintaining the Transmitter
This section explains how the Transmitter should be cared for once it has been placed into service and how to change the battery.

Section 8: Technical Specifications
This section lists the technical specifications for this device including power characteristics, accuracy, and operating characteristics.

1.2. About the Device

The Wireless Dual Discrete Input Transmitter is a reliable Radio Frequency (RF) transceiver coupled with a dual-channel switch input that can be used to monitor simple apparatuses in hazardous and hard-to-reach areas.

The time and expense of running wires often makes it difficult to monitor parameters that have an economic impact on your plant operation, but the Switch Input Transmitters allow you to quickly and accurately monitor those devices at a fraction of the cost, which gives you bigger and faster returns on your instrumentation investments.

The Transmitters communicate in a secure, digital protocol over a band of frequencies from 869.4 MHz to 869.65 MHz. This data communication technique has been the backbone of the military's secure communications protocols for many years. These devices require no wires, permits or licenses, and they are easily set up and installed right out of the box.

You can use this device for long term monitoring in remote locations, for short-term data gathering on process conditions, or to quickly test the economic viability of a new installation.

The purpose of this Guide is to help you install and maintain your Wireless Dual Discrete Input Transmitter. Before setting up and installing the Transmitter, please setup and configure the Base Radio.

1.3. Approvals

CE Conformity
These models are in conformity with the protection requirements of European Council Directives: 89/336/EEC, the EMC Directive, and 1999/5/EC, the Telecommunications Directive in accordance with EN 300 220-3-2000, EN 300 489-1-2005, EN 300 489-3-2002, and EN 61326-1997+A1+A2. Conformity of this product with any other "CE Mark" Directive(s) shall not be assumed.
ATEX Certifications
Intrinsically Safe, Zone 0/1: Ex II 1 G EEx ia IIC T4 (Ta = -40°C to +65°C) IP65
Non-Sparking, Zone 2: Ex II 3 G EEx nA, IIC T6 (Ta = -40°C to +85°C) IP65

1.4. Unpacking

Remove the Packing List and check off the actual equipment received. If you have any questions about your shipment, please call your Honeywell Representative. Upon receiving the shipment, inspect the container for any signs of damage in transit. Especially take note of any evidence of rough handling. Report any apparent damage immediately to the shipping agent.

Please note that sometimes units are assembled with accessories when shipped. Inspect the shipment carefully if you think that something is missing. This is rare, as we take considerable care to pack units for shipment, but it does sometimes happen. Please give us a call and we may be able to resolve this matter quickly over the phone.

Note *The carrier will not honor any claims for damage unless all shipping materials are saved for their examination. If you find any damage while you are examining and removing the contents, save the packing material and the carton.*

1.5. Software Compatibility

Software for Honeywell is revised periodically. Internal device software may contain portions that are not compatible with previous versions of Wireless Management Toolkit (WMT) software.

To ensure software compatibility, WMT version 1.70.138 or later must be used. If you believe you are experiencing software compatibility issues, please your local representative or email bill.europe@Honeywell.com.

If you use the Analog/Digital Output Module (Models A Option, B Option or C Option) with this Transmitter, firmware version 1.70 needs to be downloaded to the Analog/Digital Output Module.

Quick Start

This section summarizes what must be done in order to get the device installed, configured, and in operation quickly. However, it does not provide detailed or how-to information to perform the tasks outlined.

[1] Install the Transmitter in the desired location of operation.

[2] Wire input switches as shown in the figure below.

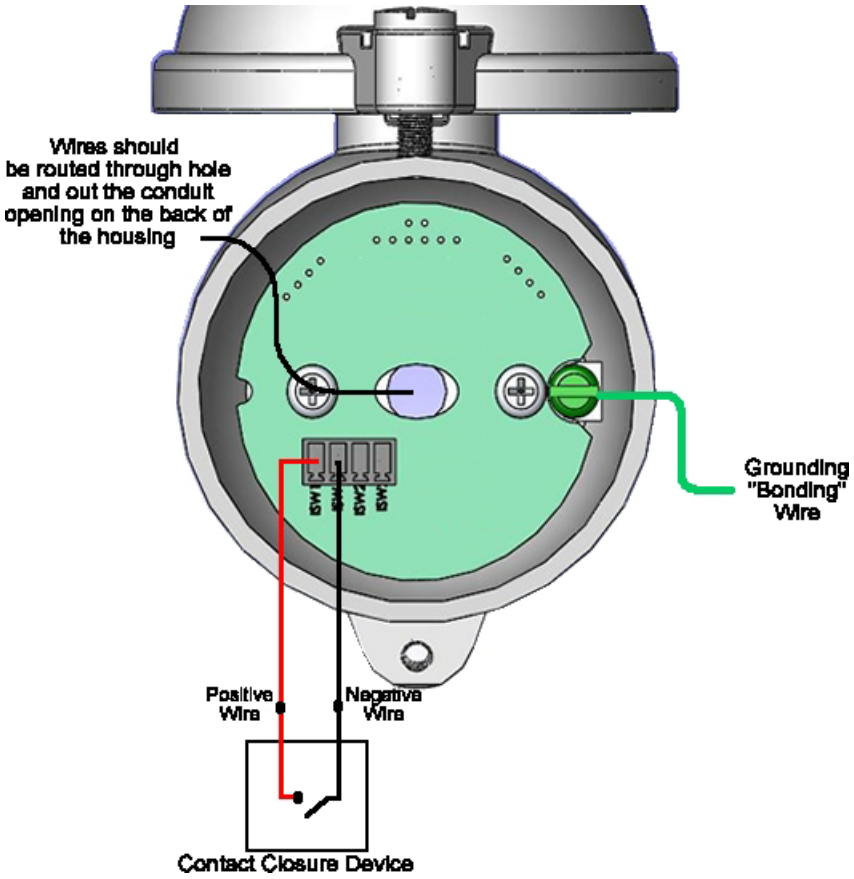

Wires should be routed through hole and out the conduit opening on the back of the housing
Grounding "Bonding" Wire
Positive Wire
Negative Wire
Contact Closure Device

Figure 0-1: Input Switch Wiring

[3] Ground Transmitter via grounding screw provided in enclosure.

[4] Close enclosure and secure enclosure via set screw.

[5] Turn on Transmitter by pressing ENTER and NEXT buttons simultaneously and holding until unit powers up.

[6] Set RF CHAN setting equal to the Base Radio's RF Channel.

[7] Set BAUD RT setting equal to the Base Radio's Baud Rate.

[8] Set RF ID number to be a unique value between 1 and 42.

[9] Select normal transmission rate.

If the “RF OFF” message is being displayed on the Transmitter LCD, perform the following:

- Set the RF CHAN setting equal to the Base Radio’s RF Channel.

If “NO RF” is being displayed on the Transmitter LCD, check the following:

- Is the Transmitter set to the above listed configurations?
- Is the Base Radio on?
- Are the Transmitter and Base Radio set to the matching configurations? (See Section 5 of the Transmitter and Base Radio User Guides)
- Are the Base Radio and Transmitters unable to communicate due to obstructions or distance? (See Section 3.1.1 Transmitter Positioning).

Warning! If the Transmitters have been running for an extended period of time with no signal from the Base Radio (the Base Radio is off or not present), the Transmitters will only search for the Base Radio every one hour or so. Turning the Transmitters off and back on will cause them to begin searching immediately.

Installation

This section discusses both the mechanical and electrical areas of installation.

1.6. Mechanical Installation

In this section, mechanical installation instructions are discussed for the various setup capabilities of the Switch Input Transmitter.

The Honeywell Wireless Dual Discrete Input Transmitter is a rugged device, but it provides much better performance if installed with careful consideration, as noted in this guide. It may be utilized in any dry contact switch input service so long as care is exercised to prevent exposing the switching elements to excess stress or temperature. Installation practices have a lot to do with these service parameters and the life that you can expect from your Honeywell Wireless Dual Discrete Input Transmitter.

Give careful consideration to the environment where you will be installing your instrument. Avoid installations that expose the device to excess temperature, high vibration, considerable shock, or exposure to dripping condensate or corrosive materials. Also avoid installing the device in an unserviceable location.

Most often these problems can be avoided with some thought at the time of installation. The practices noted below are generally recommended, but they can only act as a guideline and cannot cover all possible variations. The final installation must be made at the discretion and approval of the user. You must be the judge of the actual installation.

Dimensioned mechanical drawings for aid in mechanical installation are located in Section 9: Technical Specifications.

1.6.1. Transmitter Positioning

Correct positioning of the Transmitter will ensure the best performance of the device. When planning the positioning of the Transmitters there are a few parameters that must be paid attention to:

- The top of the Transmitter should point in an upward fashion. The bottom of the Transmitter should NOT point directly at the Base Radio and the Transmitter LCD should point away from the Base Radio.
- All Transmitters should maintain an approximate spacing of at least six feet apart from one another. Should you need to put Transmitters closer than six feet, please see Section 3.1.1.1 entitled “Technique for Close Positioning of Transmitters”.
- The line of sight range between a Transmitter and Base Radio is 2000 feet (600 m). Note that this range is reduced by the amount of RF Noise present, obstructions, and the material properties of the obstruction.

- Only place the Transmitter in ambient operating temperatures of -40°F to 185°F (-40°C to 85°C).

Figure 3-1, shown below, gives examples of incorrect setups according to the previously mentioned parameters.

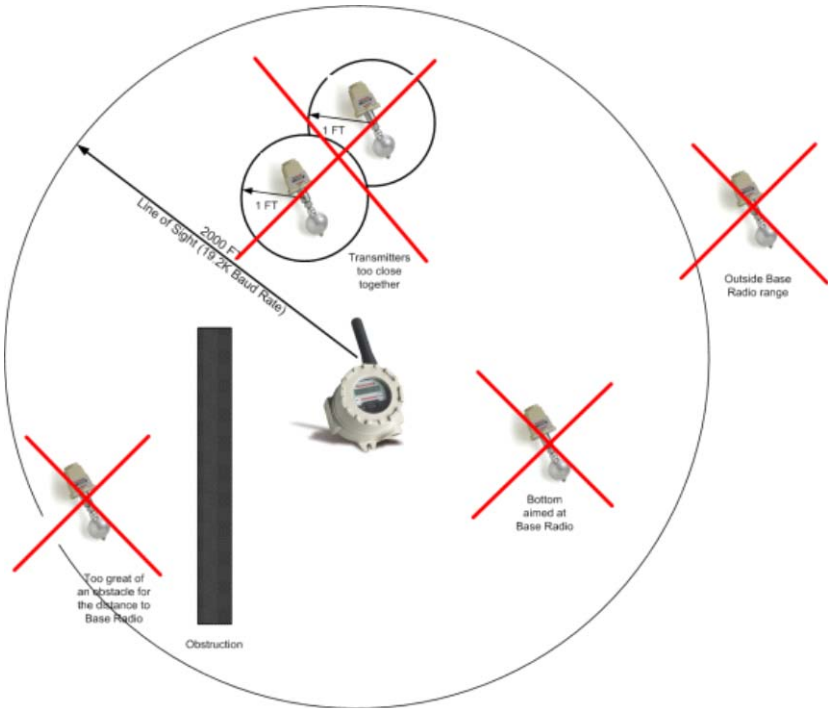

1 FT
1 FT
Line of Sight (19.2K Baud Rate)
2000 FT
Transmitters too close together
Outside Base Radio range
Bottom aimed at Base Radio
Too great of an obstacle for the distance to Base Radio
Obstruction

Figure 0-1: Examples of Incorrect Transmitter Positioning

Because there are so many setup possibilities we cannot cover them all. A correct setup would make sure that the above warnings are heeded, and that the Transmitter and Base Radio are capable of communication. The RF Placement Test section will help you to determine if you have selected the correct installation points and orientations for your application.

Warning! During installation do not apply force to the instrument housing or antenna. Use a proper wrench for all installations. Failure to use correct installation procedures can cause damage to the Transmitter.

3.1.1.1 Technique for Close Positioning of Transmitters

Transmitters may be placed closely together by carefully following this procedure. If this procedure is not followed, the communication range of the Transmitters will be significantly reduced and the Transmitters may eventually lose communication with the Base Radio entirely. This procedure is easy to implement, but please read carefully for a full understanding.

The Base Radio synchronizes with the Transmitters in synch groups of 7,organized by their RF ID numbers. If you want to place two Transmitters closer than 6 feet, make sure that you have set them in

different groups. Note that this only applies to Transmitters that are communicating with the same Base Radio. The groups are defined in the following table:

Group	RF ID Range
1	1-7
2	8-14
3	15-21
4	22-28
5	29-35
6	36-42

For example, if two Transmitters are placed one foot apart and the first Transmitter has an RF ID number of 027 that means it is in the 4th group (22-28). The second Transmitter must have an RFID number that is in another group (less than 22 or greater than 28). Setting the RF IDs of two closely spaced Transmitters so that the RF ID numbers are greater than 7 apart ensures that the Transmitters are in different Base Radio sync groups. This allows the closely spaced Transmitters to properly receive their synchronization signal from the Base Radio and maintain their proper communication and range.

You can also ensure that closely spaced Transmitters maintain their synchronization with their Base Radio by simply assigning each of the two closely spaced Transmitters to talk to a different Base Radio.

Either way, following this process will keep the Base Radio and Transmitters properly synchronized for long-term communication.

1.6.2. Special Conditions for Safe Use

Parts of the enclosure are non-conducting and may generate an ignition-capable level of electrostatic charge under certain extreme conditions. The user should ensure that the equipment is not installed or used in a location where it may be subjected to external conditions (such as high-pressure steam) which might cause a build-up of electrostatic charge on non-conducting surfaces. Additionally, the equipment must be cleaned only with a damp cloth.

As aluminum may be used at the accessible surface of this equipment, in the event of rare incidents, ignition sources due to impact and friction sparks could occur. This shall be considered when the Honeywell XYR-5000 series Transmitters are being installed in locations that specifically require group II, category 1G equipment.

The following Honeywell Transmitter types have flying leads and require installation in suitable conduit. The leads shall be terminated such that they are provided with adequate protection appropriate to the intended installation location.

- WT533R-a-3G RTD Temperature Transmitter, Split Unit
- WT533T-a-3G T/C Temperature Transmitter
- WW593-3G Dual Switch Input Transmitter
- WI555-3G Dual 4/20mA Transmitter
- WI556-3G Dual 0-10V Transmitter

The Sensor terminals and the Input SW terminals of the following Honeywell XYR-5000 series Transmitter types shall be installed as separate intrinsically safe circuits:

- WI555-3G Dual 4/20mA Transmitter
- WI556-3G Dual 0-10V Transmitter

1.7. Testing Communications

Remember, proper placement of the Transmitter will optimize your RF communication range and capabilities. Perhaps the best test to perform before mechanically mounting the unit is a quick hand-held test. There are two types of tests you can conduct: the RSSI (Received Signal Strength Indicator) Diagnostic and the Link Test. The RSSI Diagnostic measures the strength of the signal at the Transmitter. The Link Test measures the throughput of data sent to and from the Transmitter. The Link Test may be conducted from the Transmitter, Base Radio, or through WMT.

The RSSI Diagnostic should be conducted first to determine if the Base Radio is communicating with the Transmitter. Then the Link Test may be performed to test the validity of the installation.

To perform these tests you should have a good idea of where the Base Radio will be placed (for more information see Section 3 of the Base Radio User Manual). Place the Base Radio in the desired area and power on. Make sure that the Base Radio and Transmitter are on the same RF Channel and Baud Rate (See Section 5). You may also have to increment the number of Transmitters with which the Base Radio is communicating (See the Base Radio User Manual Section 4.3).

Once both the Base Radio and Transmitter are set up to be on the same network, make sure communication is established by looking at the Transmitter LCD for the ‘RF OK’ message in the Read-Only Sequence (see Section 4.2.1).

After communications have been established, go to Section 3.2.1 for the RSSI Diagnostic or Section 3.3 for the Link Test.

1.7.1. Transmitter RSSI Diagnostic

The Transmitter should be placed in RSSI Diagnostic mode to determine the signal strength at the location of the equipment to be monitored.

The RSSI Diagnostic, located in the Transmitter's diagnostic menu, displays the RF signal strength in one of seven ranges. The signal strength is displayed on the LCD using a combination of '>' and '_' characters. Full signal strength is displayed as "> > > > > > >" while minimum signal strength is displayed as "> _ _ _ _ _ _ _". If the Transmitter is not communicating with the Base Radio (i.e. NO RF), all underscore characters will be displayed ("_ _ _ _ _ _ _").

The RSSI is measured every time the Transmitter receives a message from the Base Radio. The signal strength of the received message from the Base Radio is calculated during this time. The actual signal strength in dBm for each range is shown below:

>	>	>	>	>	>	>
Less than	Between	Between	Between	Between	Between	Greater than
-105 dBm	-105 dBm & -100 dBm	-100 dBm & -95 dBm	-95 dBm & -90 dBm	90 dBm & -85 dBm	-85 dBm & -80 dBm	-80 dBm

To place the Transmitter in RSSI Diagnostic mode follow the menu map shown in Figure 3-2. Note that the RSSI menu is under the DIAGNSE menu and not the CONFIG menu.

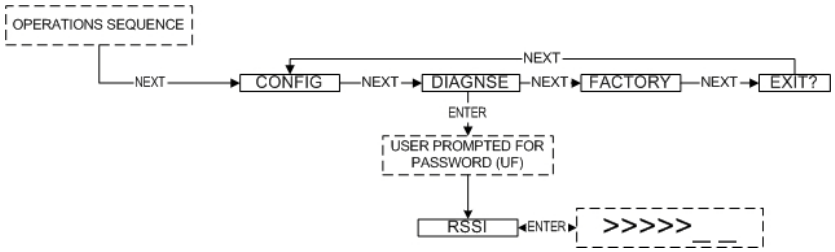


Figure 0-2: Menu Map to RSSI Mode

Now that the Transmitter is in the RSSI mode, bring the Transmitter close to the equipment you wish to monitor. Look at the LCD; notice the '>' will constantly fluctuate. One should estimate an average value based on these fluctuations. The ideal signal integrity is seven arrows.

Once you have verified that you are receiving a signal, you should check to make sure the Transmitter is communicating properly with the Base Radio. To do so, exit the RSSI by pressing ENTER, and then navigate to EXIT? of the diagnostic menu and return to the Operations Sequence shown in Figure 4-1 in Section 4.2.

If you see a NO RF message, then you do not have satisfactory RF communication with the Base Radio. If your application allows, move the Transmitter to a different position and check again for communications.

One final solution is to reposition the Base Radio. However, this may affect communications with previously installed Transmitters, and if so, may require the use of a second Base Radio for your application. To select a better spot for the Base Radio, see Section 3.1.1 of the Base Radio User Manual.

1.8. Link Test

The Link Test measures the wireless link performance of a Transmitter running in its normal operating mode. Messages are sent from the Transmitter to the Base Radio at a predefined interval called the Transmit Rate (see Section 6.1). Each message contains data for the previous time period (since the last transmit). The Link Test looks at the wireless performance going in both directions, from the Transmitter to the Base Radio and vice versa, and comes up with a rating. The result that appears on the display shows the determined link strength.

In order to perform this test, the Transmitter must be communicating on the same channel and baud rate as the Base Radio. See Section 5 to configure communications.

The Link Test may be conducted from the Transmitter, Base Radio, or through WMT. Running the Link Test from WMT is ideal for testing communications for an installation with remote or hard-to-get-to Transmitters. To conduct the Link Test from a Base Radio, see Section 3.3.2. To conduct the Link Test from WMT, see Section 3.3.3.

1.8.1. Conducting a Link Test from the Transmitter

The Link Test is located in the Transmitter's diagnostic menu (see Figure 3-3).

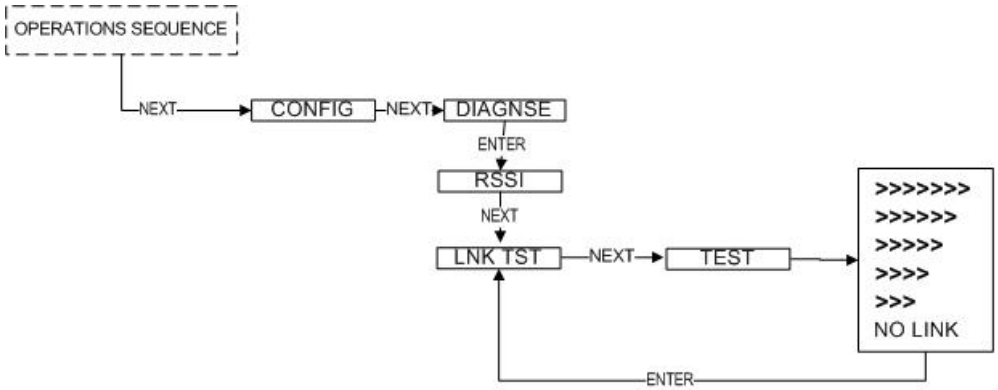


Figure 0-3: Transmitter Link Test

Using the NEXT and ENTER buttons, navigate to Link Test, and press the ENTER button to begin the test. The Transmitter will begin to test the link in both directions (to and from the Base Radio). During this time, the word TEST will appear on the LCD display. When the test is complete, the Transmitter will display the quality of the link. Be aware that the Transmitter uses the configured Baud Rate and transmission rate to perform this test. The length of time it will take to perform this test is dependent upon how fast the device is normally transmitting.

When enough messages have been observed, a link strength will be shown on the display. >>>>> indicates the strongest link, while > indicates the weakest link. The Link Test will continue to be evaluated and the rating on the screen may adjust itself. Keep in mind that the longer the Link Test runs the more data the Transmitter will have to evaluate.

The Transmitter installation site should strive to place the Transmitter in a location where it receives the highest number possible. A stronger link means less data re-transmits and better battery life.

1.8.2. Conducting a Link Test from the Base Radio

When the Link Test is conducted from a Base Radio, it measures the link strength between a selected Transmitter and the Base Radio. The Link Test data must be configured to match the communication parameters of the Transmitter from which you want to test. The Link Test is located in the Base Radio's diagnostic menu (see Figure 3-4).

To conduct a Link Test from the Base Radio, Navigate to Link Test, and press the Enter button. Next enter the RF ID for the Transmitter that you want to test. Then select the Normal Transmit rate that matches that of the Transmitter. If the Transmitter is transmitting at a different rate than the one you select in this menu, your results will be invalid.

Once the Normal Transmit Rate is selected, the Link Test will immediately start. The Base Radio will begin to test the link from the Transmitter. During this time, the word TEST will appear on the LCD display. When the test is complete, the Base Radio will display the quality of the link. Be aware that the length of time it takes to perform this test is dependent upon how fast the Transmitter is normally transmitting.

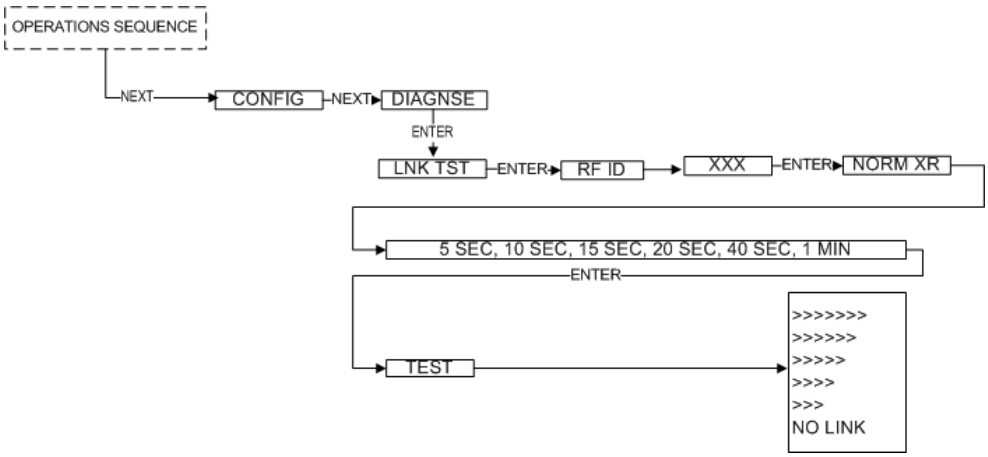


Figure 0-4: Transmitter Link Test

When enough messages have been observed, a link strength will be shown on the display. >>>>> indicates the strongest link, while > indicates the weakest link. The Link Test will continue to be evaluated and the rating on the screen may adjust itself. Keep in mind that the longer the Link Test runs the more data the Transmitter will have to evaluate.

The Transmitter installation site should strive to place the Transmitter in a location where it receives the highest number possible. A stronger link means less data re-transmits and better battery life.

1.8.3. Conducting a Link Test from WMT

To conduct a Link Test from WMT, make sure that WMT is running on the PC attached to the Base Radio. Then go to the Transmitter view, and right-click on the Transmitter you want to test Received data transmission from (Figure 3-5).

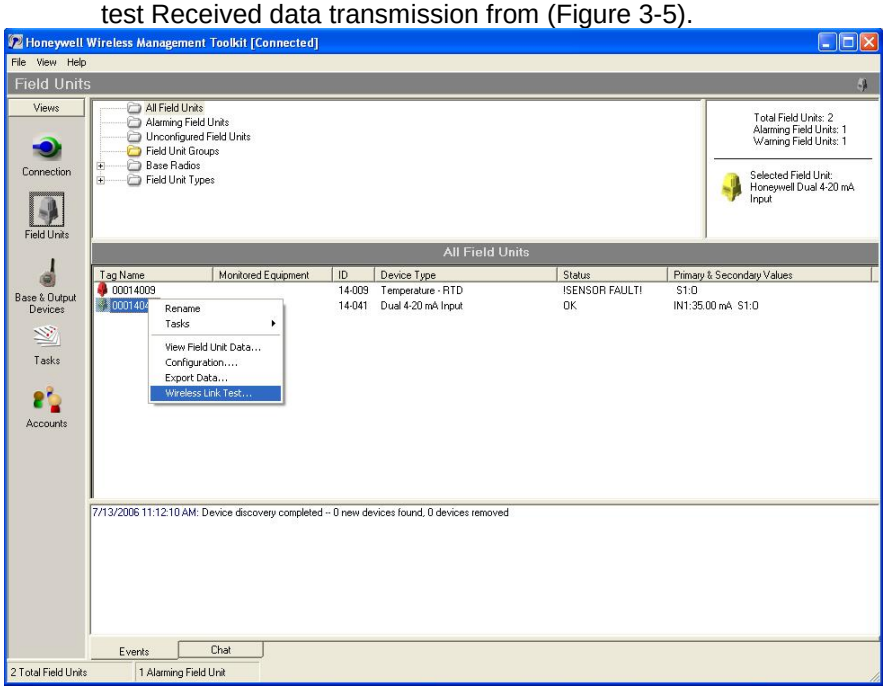


Figure 0-5: WMT Transmitter View

Select **Wireless Data Loss Test…** from the popup menu.

The Wireless Data Loss Test window appears (Figure 3-6). The name of the Transmitter being tested appears in the title bar in parenthesis.

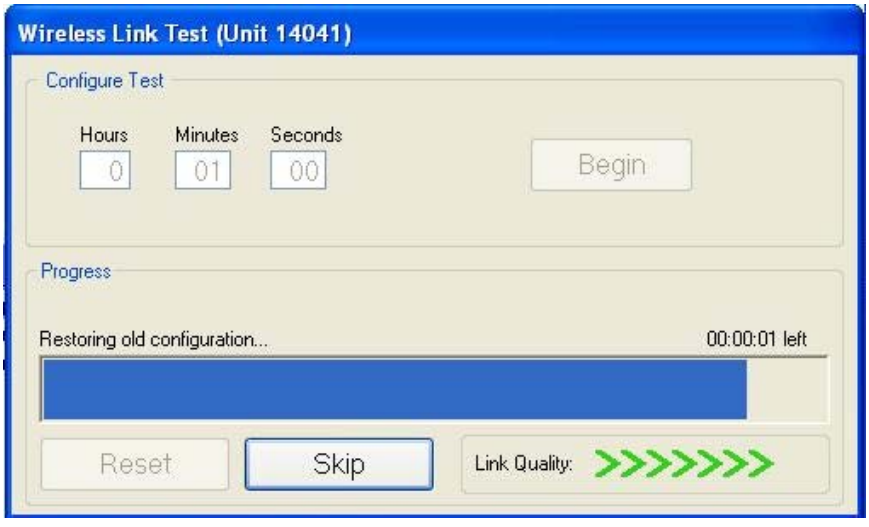


Figure 0-6: Wireless Data Loss Test

In the top of the window, you can configure the test to run for a specified amount of time. The longer the test, the more data the test will have to do an evaluation. Type the length of time that you want to run the test and click **Begin** to start. After the test has completed, it will restore the previously configured Transmit Rate.

During the test, the communications reliability is evaluated while the Transmitter is running under normal operating conditions. As the test runs, a link strength will be shown in the lower right hand corner of the window. >>>>> indicates the strongest link, while > indicates the weakest link. The Link Test will continue to be evaluated and the rating on the screen may adjust itself for the specified amount of time.

1.9. Electrical Installation

In this section wiring instructions are discussed for the various setup capabilities of the Switch Input Transmitter. The subsections are as follows:

3.4.1: Electrical Specifications
3.4.2: Wiring the Input Switches

Caution! Remember to turn off all power **BEFORE** hooking up any wires!

1.9.1. Electrical Specifications

Input Switch Characteristics

- For simple device monitoring only (i.e., contact closures)

Warning! Explosions may result in death or serious injury. Do not remove the instrument cover or open wiring housing in explosive atmospheres when power and communications are on.

1.9.2. Wiring and Configuring the Input Switches

To properly wire a switch input device to the Switch Input Transmitter, simply follow the wiring diagram in Figure 3-7. Please note that circuit power does NOT need to be supplied as the Transmitter supplies the monitoring power. The Switch Input Transmitter has the capability of monitoring two input switches.

The most common application for the switch inputs is to monitor a contact closure. However, the input switches must only be attached to simple devices. A simple device is one that meets the conditions set forth in the Intrinsic Safety Control Drawing, which can be found in the Technical Specifications section of this guide.

Warning! Wiring the Switch Input Transmitter to a non-simple device (such as an explosion proof device) **voids the intrinsic safety of the Transmitter**. A simple device is one that meets the conditions set forth in the intrinsic safety Control Drawing found in the Technical Specifications section of this guide.

The diagram shown in Figure 3-7 refers to the circuit board found at the base of the Transmitter, within the junction box. Before connecting wires to the terminal blocks, the input wires should be routed into the back of the enclosure and threaded through center of the circuit board.

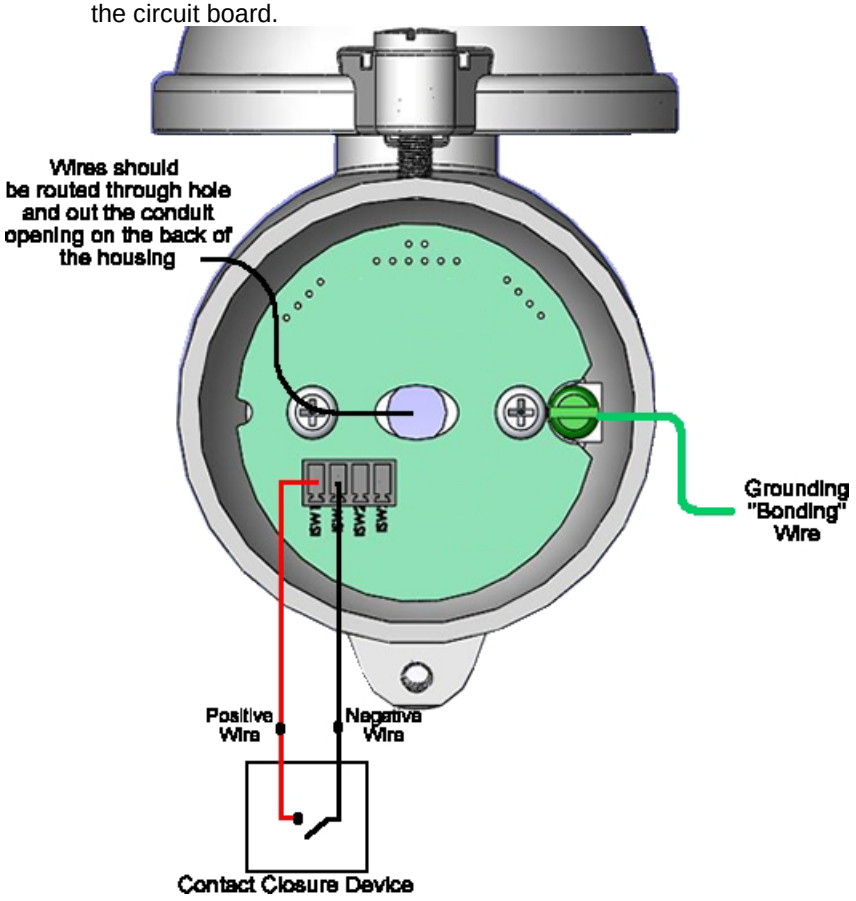

Wires should be routed through hole and out the conduit opening on the back of the housing
Grounding "Bonding" Wire
Positive Wire
Negative Wire
Contact Closure Device

Figure 0-7: Input Switch Wiring Diagram

Messages indicating the status of both monitored contact closure switches are displayed on the Transmitter LCD. This is displayed as: S1 OPEN/CLSD and: S2 OPEN/CLSD. If no input is available then: S1 N-A is shown. This is illustrated in Figure 4-1. The status of the input switches can also be found in WMT under the Transmitter View. An open contact closure is indicated as an 'O' and a closed contact closure is indicated as a 'C' on the Transmitter View for each input switch (see WMT User Guide section 8.1).

After the Input Switch has been wired, it needs to be enabled. Switches can be enabled from the Transmitter front panel or the Transmitter Configuration Menu in WMT. To enable a switch from the Transmitter, follow the menu map in figure 3-8:

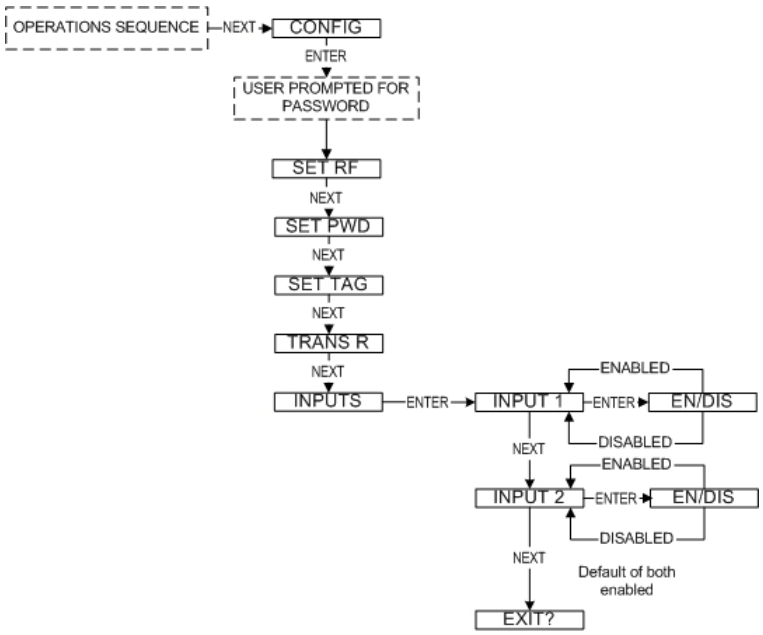


Figure 0-8: Menu Map to Enable the Input Switches

In WMT, go to the Input Switches configuration tab. For more details on how to access this menu see Section 9.2 of the WMT User Guide. Check the Enable Input check box to enable a switch.

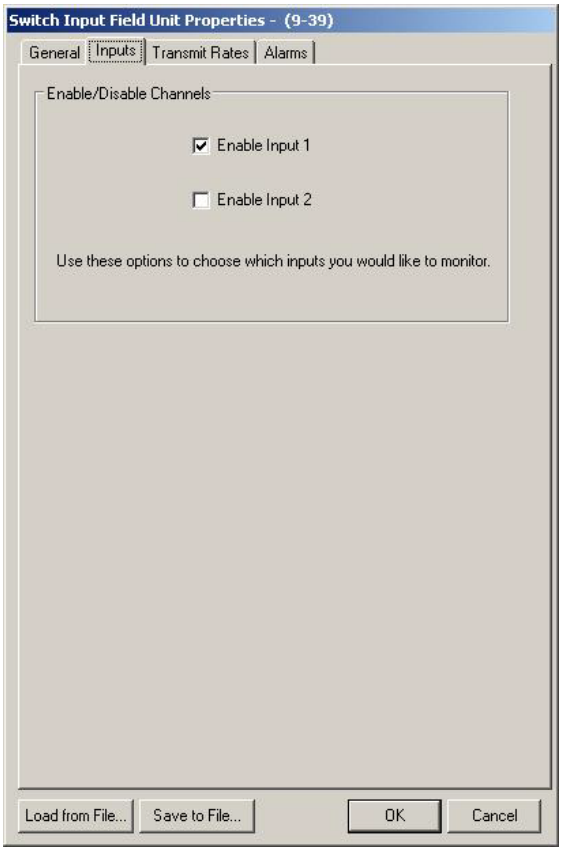


Figure 0-9: Input Switch Configuration using WMT

2. General Configuration

This section discusses general configuration of the Transmitter via the NEXT and ENTER buttons. The subsections are as follows:

4.1: Navigating User Menus
4.2: Transmitter Displayed Messages
4.3: Overall Configuration Menu Map
4.4: Setting the Transmitter Tag Name
4.5: Setting a User Password
4.6: Resetting All Transmitter Settings

2.1. Navigating User Menus

Pressing either the NEXT or ENTER buttons located on the front of the Transmitter or Base Radio just below the LCD screen is all that is needed to navigate the respective menus. Pressing both of these buttons for one second will turn the unit on.

Pressing the NEXT button at any time while the Transmitter is cycling through the normal messages causes the Transmitter to enter the setup mode. The NEXT button is then used to step through menu options, and the ENTER button is used to enter a sub menu of what is displayed on the LCD at that time. If no button is pressed within a 30 second period the unit goes back to the normal display mode.

If you enter a sub menu that requires a numerical input, such as 001, the left most 0 will be blinking. This indicates that pressing the NEXT button will increment this value with each press from 0 to 9 and back to 0 again. Pressing the ENTER button will move to the next available value. If the last value is blinking, pressing ENTER will save the entered values and return from the sub menu.

If both the NEXT and ENTER buttons are depressed at the same time, a message on the LCD displaying OFF? will appear. If both buttons are released upon appearance of this message the user will be returned to the scrolling main screen. If both buttons are not released for the duration of the OFF? message, you will be prompted for the password. Upon entering the correct password, the unit will power down and turn off.

Note *If the unit is turned off while entering values in a sub menu, those values will NOT be saved.*

Note *There are several menu options that will automatically turn off if you are using WMT. All changes to these Transmitter menu options should then be made through WMT instead. This is to prevent simultaneous changes from taking place. If you wish to discontinue use of the software and want these menus re-instated, you must contact your Honeywell Sales Representative.*

2.2. Transmitter Displayed Messages

To turn the Transmitter on, press and hold both the NEXT and ENTER buttons for a few seconds. Upon power up, the Transmitter will display the Power-Up Sequence, and then go into the Operations Sequence. These Sequences are shown in Figure 4-1 below:

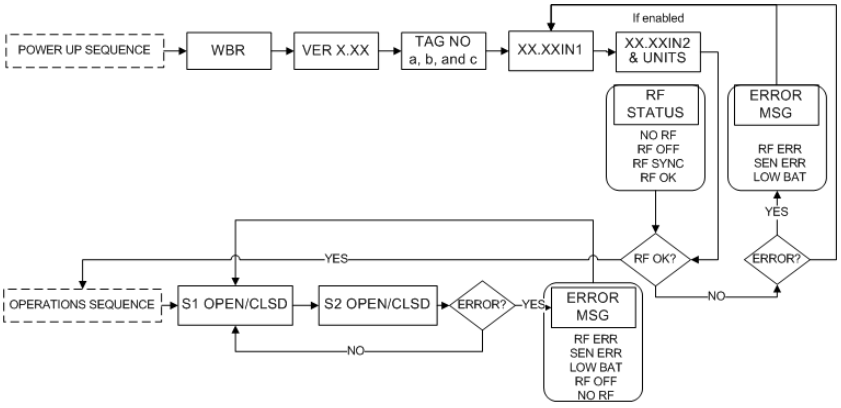


Figure 2-1: Transmitter Power-Up and Operations LCD Sequences

Note *During configuration and testing, keep Transmitters at least six feet from the Base Radio and other Transmitters to ensure good communications.*

2.2.1. The Read-Only Sequence

Once the Transmitter is in the Operations Sequence, a user may access the Read-Only Sequence without a password by simply pressing the ENTER button at any time. The Read-Only Sequence, as shown in Figure 4-2, displays extra information about the current settings of the Transmitter that are not seen during the Operations Sequence, but does not allow any changes to be made to these settings.

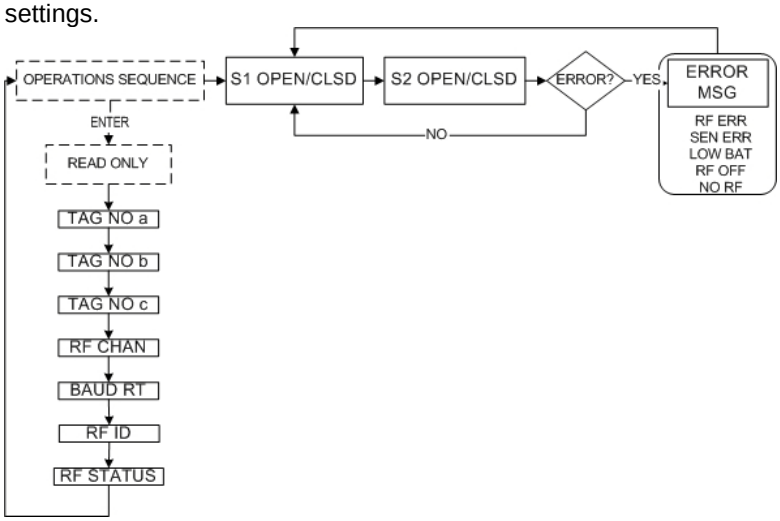


Figure 2-2: The Read-Only Sequence

2.3. Overall Configuration Menu Map

A complete Transmitter Menu Map is shown in Appendix C. Below is an overall view of the configuration menu to aid the user in setting up the Transmitter for proper operation.

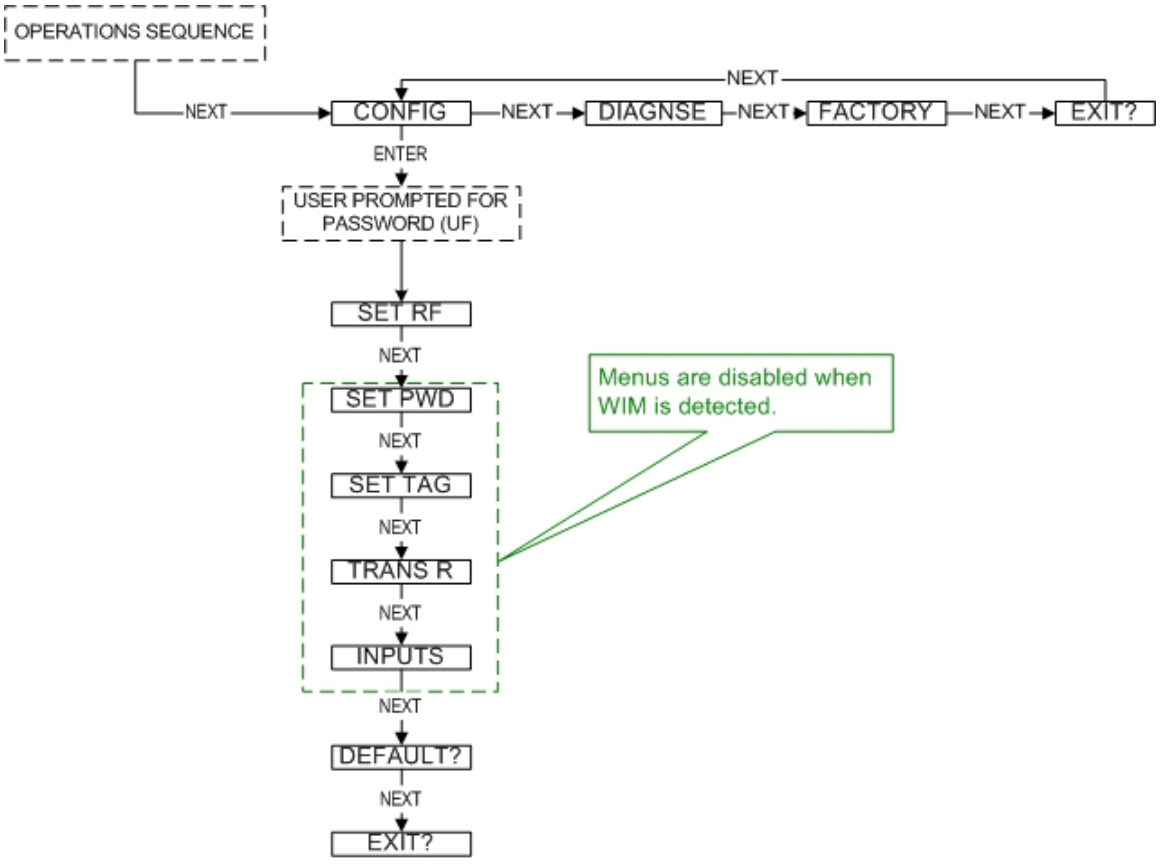


Figure 2-3: Overall Configuration Menu Map

Note *The user must enter a four-digit password to enter the CONFIG and DIAGNSE menus. The default user password is 0000. The FACTORY menu is for factory use only. For more information on the password see Section 4.5.*

2.4. Setting the Transmitter Tag Name

Note *Once WMT has been used to configure the Transmitter, this menu option will be disabled on the Transmitter LCD menu. See Section 4.1 for more details.*

Each Transmitter has a user-settable Transmitter Tag Name. This Tag Name is displayed upon Transmitter power up, and when the Read-Only Sequence is selected. The Tag Name is a 21-character string that is displayed in three separate 7-character flashes on the Transmitter LCD.

The user may choose from A-Z, 0-9, a dash ("-"), and an underscore ("_"). The underscore has a special meaning to the software inside the Transmitter. For example, if you have a Tag Name that is only 5 characters long, then you do not want to wait for the rest of the 16 characters to be displayed on the LCD. So if your Tag Name was "TANK1", you would want to enter the Tag Name like this: "TANK1_ _ _ _ _ _ _ _ _ _ _ _ _ _ _ _".

The Tag Name can also be entered via WMT. To do so, when the software is in the Transmitter view (See Appendix A), right-click the Transmitter icon, select Rename, and then enter the Tag Name you wish the Transmitter to have.

This Tag Name will then be uploaded to the Transmitter and can be displayed by pressing the ENTER button when the unit is in the Operations Sequence (see Section 4.2.1 of this manual).

2.5. Setting a User Password

Note *Once WMT has been used to configure the Transmitter, this menu option will be disabled on the Transmitter LCD Menu. See Section 4.1 for more details.*

Each Transmitter has a password that will lock out undesired users from making changes to the Transmitter. Any user may still view some of the Transmitter settings by pressing the ENTER key during the Operations Sequence and viewing the Read-Only Sequence.

The password is a four-digit password. The factory default is 0000. If you wish to select a different password, follow the Transmitter Menu Map shown in Figure 4-4 to change it.

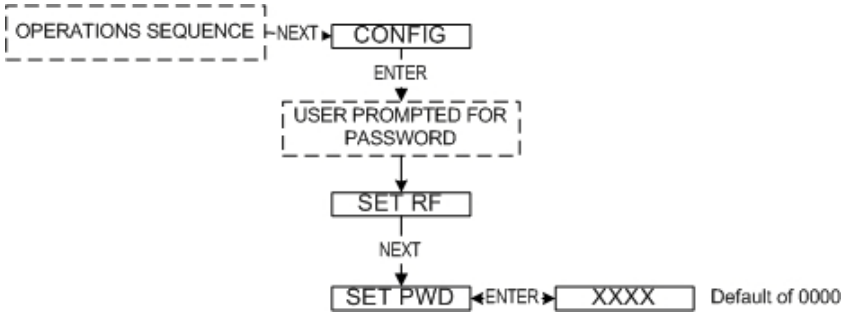


Figure 2-4: Menu Map to Password Setting

The password can also be configured via WMT. To do so, enter the configuration dialog box (See Appendix A). From the configuration dialog box click on the **General** tab to bring up the general information as shown in Figure 4-5.

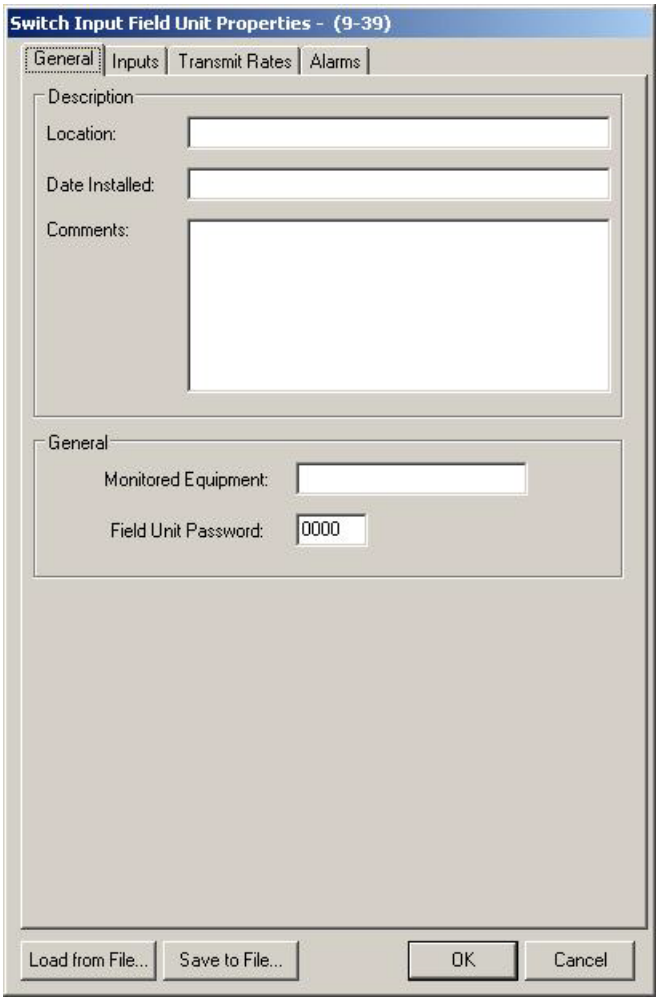


Figure 2-5: Setting a User Password

You can set the Transmitter password for this device by entering a four-digit number in the **Transmitter Password** field. Once a password has been entered, click OK to save and download the password to the Transmitter.

Please note that the password only protects the Transmitter from unauthorized configuration via the NEXT and ENTER buttons. WMT requires a user login password to gain access to all configuration parameters. However, user accounts are available and can be set with different access levels and restrictions (For more information on user accounts see the WMT User Manual Section 8.4).

2.6. Resetting All Transmitter Settings

To reset all Transmitter settings to their default state, you must navigate to the DEFAULT menu option in the CONFIG menu via the keypad.

Note *Once at the default menu option, pressing the ENTER button will display 'RESET?' on the LCD; which asks if you are sure you want to reset the device to its default configuration. You will then be prompted with 'NO' on the LCD. Pressing the ENTER button while 'NO' is being displayed will NOT reset the device. Pressing the NEXT button will display 'YES' on the LCD. If you press the ENTER button while 'YES' is being displayed the device will be reset.*

Note *Resetting the Transmitter by using the DEFAULT menu option will not reset the TRIM or OFFSET values.*

3. Configuring the RF Communications

In order for the Transmitter and the Base Radio to communicate, they must be on the same RF Channel and must be transmitting at the same Baud Rate. While all Transmitters and Base Radios are set to default configurations at the factory, if any configuration differences are present, the Base Radio will not be able to communicate with the Transmitters. The subsections are as follows:

5.1: RF Channel Selection
5.2: Baud Rate Selection
5.3: RF Identification Selection

Warning! If the Transmitters have been running for an extended period of time with no signal from the Base Radio (the Base Radio is off or not present), the Transmitters will only search for the Base Radio every one hour or so. Turning the Transmitters off and back on will cause them to begin searching immediately.

3.1. RF Channel Selection

The RF Channel defines a set of frequencies on which communication takes place between the Base Radio and the Transmitter. Each RF Channel has a different set of frequencies, thus allowing the user to have multiple different wireless networks co-existing throughout the same facility.

All Base Radios and Transmitters can be set to one of 4 different RF channels. The only Transmitters recognized by a particular Base Radio are the units that are on the same RF Channel as that Base Radio. This allows the user to decide which Transmitters communicate with each Base Radio.

The RF Channel can be thought of as a set of walkie-talkies. If both walkie-talkies are on channel one they can communicate. If a walkie-talkie is on channel one and the other is on channel two, they cannot communicate. Likewise, if two walkie-talkies are on channel one and two other walkie-talkies are on channel two, the walkie-talkies on channel one cannot hear what is being transmitted by the walkie-talkies on channel two.

Each Transmitter comes from the factory with the RF Channel set to OFF. This means the Transmitter will not communicate to any Base Radio. To set the Transmitter for communication, first determine the channel that you want to use. Then follow the Transmitter menu map shown in Figure 5-1 to configure the RF Channel.

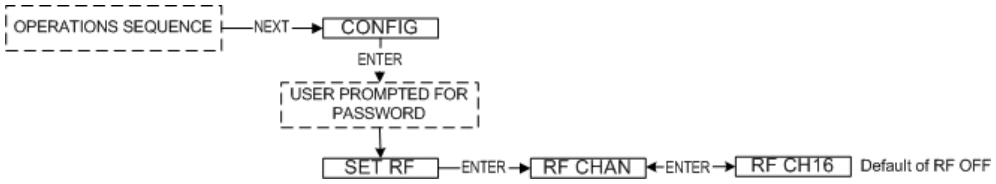


Figure 3-1: Menu Map to RF Channel Setting

Once in the RF Channel menu, increment it by pressing the NEXT button. When selecting this value, do not choose an RF Channel that is currently being used by other Honeywell Wireless Systems as this can cause communication problems.

3.2. Baud Rate

The Baud Rate is not configurable. It is set at 4.8K. This allows the Transmitter to have a fastest update rate of 5 seconds and a range of 360m to 600m (1200 ft to 2000 ft) Line of Sight.

3.3. RF Identification (RF ID) Selection

Each Transmitter is identified by the Base Radio and WMT, according to the RF ID given to that particular unit. Two Transmitters on the same RF Channel CANNOT have the same RF ID (if you do not know the RF Channel, see section 5.1). When the Transmitter is in the Operations Sequence, pressing the ENTER button displays the Read-Only Sequence on the LCD. The RF of that unit will be displayed in the format: ID 3.

All Transmitters in your system are set to a default RF ID number upon shipment. For example, if you have ordered a Base Radio and three Transmitters, the Transmitters will be configured to ID's 0, 0 and 0. You must set these units to three different RF IDs between 1 and 42. The Transmitters in this example could be set to RF IDs 1, 2, and 3.

First determine the RF ID's you'd like to give each unit. Then follow the menu map shown in Figure 5-3 to configure the RF ID. The factory default is RF ID 0, which disables the RF communication of the unit.

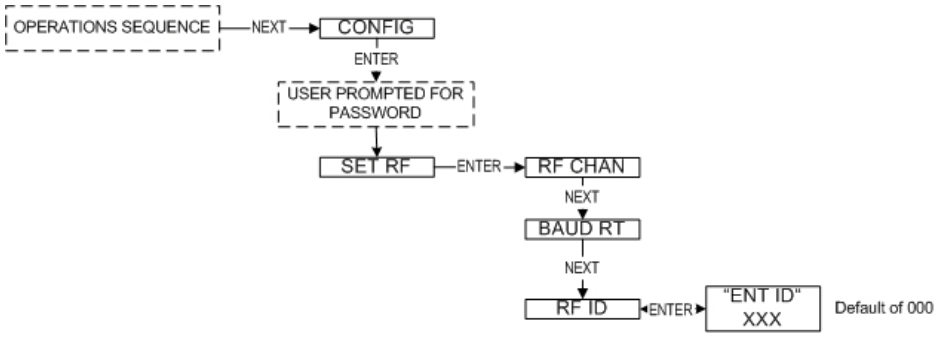


Figure 3-2: Menu Map to RF ID Setting

Once you have selected the RF ID you wish to use for this particular Transmitter, exit the menus and return to the Operations Sequence.

The Transmitter should now be successfully configured to the Base Radio. To check this, press ENTER while the Transmitter is in the Operations Sequence for the Read-Only Sequence to be displayed. You may see an RF SYNC message displayed on the Transmitter LCD. This means that the Transmitter and Base Radio are attempting to synchronize communications. If this is successful, the RF Status will display an RF OK message. If this is unsuccessful, the RF Status will display a NO RF message.

Also notice the two small arrows on either side of the LCD; if they are fluctuating up and down, that indicates the Transmitter and Base Radio are successfully communicating. If only one or none of the arrows are moving then they are not communicating successfully.

Configuring the Transmit and Sampling Rates

The Transmitter reads the inputs at a rate called the Sampling Rate. For the Switch Input Transmitter this rate is not configurable. The Transmit Rate is the rate at which the Transmitter communicates with the Base Radio. This rate is configurable. This section will walk you through the initial configuration of the Transmit settings. The subsections are as follows:

6.1: Selecting the Normal Transmission Rate
6.2: The Sampling Rate
6.3: Enabling the Smart Rate

3.4. Selecting the Normal Transmit Rate

The Switch Input Transmitter will read its inputs at an interval called the Sampling Rate. It then transmits these readings to the Base Radio at an interval determined by the Normal Transmit Rate.

In order to properly set the Normal Transmission Rate, you must first determine how often you need updates from the Transmitter. You have a selectable range of 5, 10, 15, 20, 40 seconds and 1 minute. The factory default is 10 seconds.

If all of the data does not get through, the data is resent the following second. This prevents data from being lost.

3.4.1. Configure the Normal Transmit Rate from the Transmitter

Follow the menu map below.

Note *Once WMT has been used to configure the Transmitter, this menu option will be disabled on the Transmitter LCD Menu.*

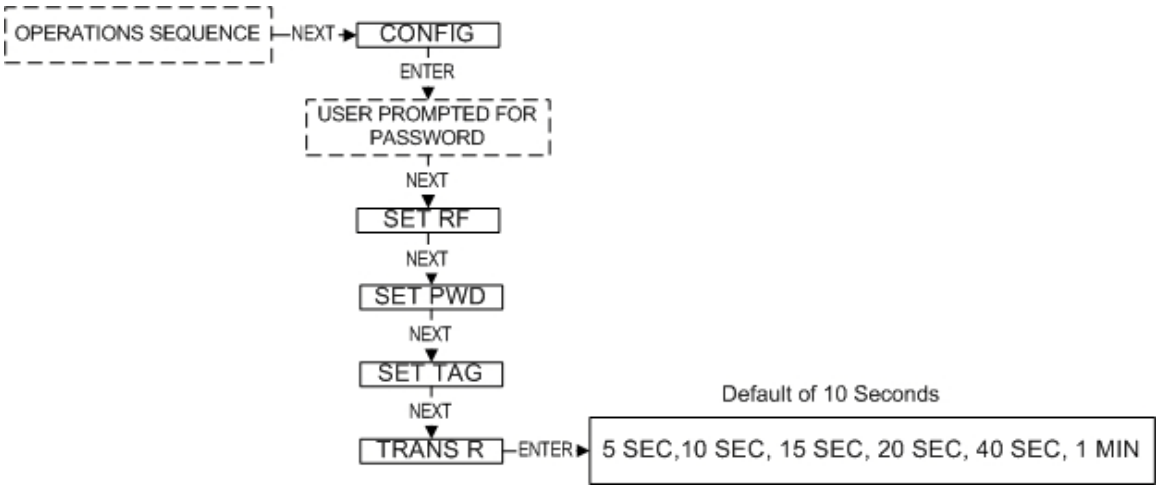


Figure 0-1: Menu Map to the Transmit Rate Setting

3.4.2. Configure the Normal Transmit Rate with WMT

[1] Open the configuration dialog box (See Appendix A).

[2] In the configuration dialog box click the **Transmit Rates** tab to display the Normal Transmit Rate information as shown below.

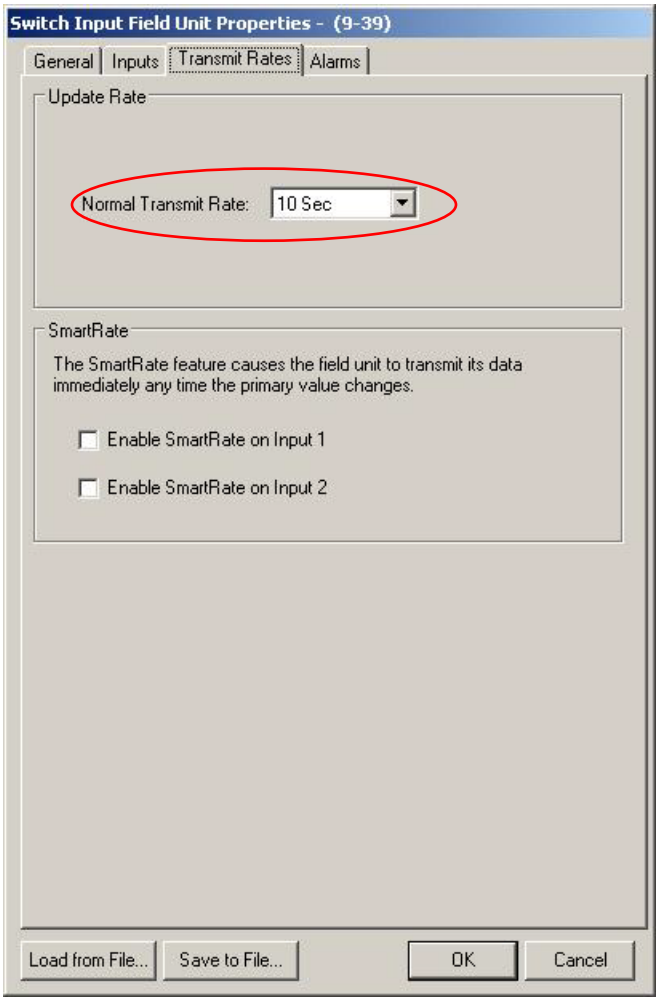


Figure 0-2: Transmit Rates Tab

[3] Select one of the time periods from the Normal Transmit Rate drop-down list box.

[4] Click **OK** to save and download the configuration changes to the Transmitter.

3.5. The Sampling Rate

The Sampling rate for the Switch Input Transmitter is not configurable. The Transmitter reads the inputs 11 times per second. It then takes the majority of the 11 readings for that second and sends that value to the Base Radio based on the Transmit Rate. For example, if 7 of the readings were Open and 4 were Closed, it would send a value of Open.

However, anytime there is a change in any of the 11 readings, along with the state of the input, a status byte is set to indicate a transition occurred and the Device Status field in WMT will display the value: Transaction.

3.6. Enabling the Smart Rate

The Smart Rate is a feature used to trigger radio transmission of the data immediately any time the value of the monitored input changes.

The Smart Rate cannot be configured from the Transmitter. The Smart Rate can only be enabled using WMT.

3.6.1. Configure the Smart Rate with WMT

[1] Open the configuration dialog box (See Appendix A).

[2] Click on the **Transmit Rates** tab to display the SmartRate information as shown below.

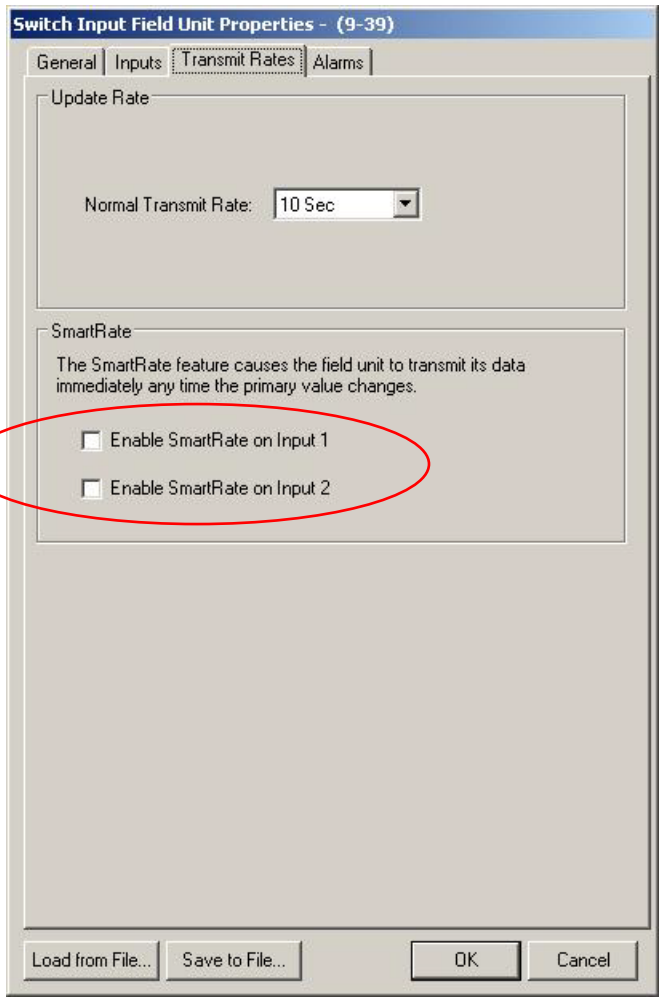


Figure 0-3: Smart Rate Configuration Using WMT

[3] Select the **Enable SmartRate** check box for Input 1 or Input 2 or for both.

[4] Click **OK** to save and download the configuration changes to the Transmitter.

4. Modbus Supplement

This section applies only if you are using the Modbus communications option for the Base Radio. If you are not using this option please skip this section.

Modbus configuration is discussed in detail in Section 6 of the Base Radio User Guide. This section discusses elements that are specific to the Switch Input Transmitter and Switch Input with Output Option Transmitter.

The following tables contain holding register values that differ for the Switch Input Transmitter. These registers are bit field registers composed of two 16-bit registers and interpreted as an IEEE 32-bit floating point value for Transmitters.

Device Type Holding Registers

The following values are for the Device Type holding registers.

Value	Device Type
26	Switch Input Transmitter
27	Switch Input Transmitter with Output Option

Device Status Holding Registers

The following values are for the Device Status holding registers.

Value	Device Status
1	Device (Transmitter) Online
2	Low Battery
4	Alarm Condition
8	Transition on Input Switch 1
16	Transition on Input Switch 2
32	System Error Condition
64	Input Switch 1 Position = Closed
128	Input Switch 2 Position = Closed

The above values are still converted from Modbus as 32-bit floating point values. For ease of use, we've arranged each status to correspond to a bit in an imaginary 8-bit binary field, logic high.

The status can be resolved by subtracting the largest number listed above from the value received from the holding register, and then subtracting the next highest and so on until the result is 0. Each of the values used indicates the respective condition listed above.

Example #1: If the holding register reads 65, subtract 64 and get 1. Then subtract 1 from 1 and get 0. Thus from the list below, Input Switch 1 is closed (64) and the Transmitter is online (1).

Example #2: If Input Switch 1 is Open and Input Switch 2 is Open, and no additional conditions exist, the value is 1. Now if

Input Switch 2 changes to closed, the value first displays 17 and then 129. 17 shows us that Input Switch 2 is in Transition (17-16) and 129 shows us that Input Switch 2 is now Closed (129-128).

Note *The Output Option status is not shown under the Device Status field. For this status, use the Primary and Secondary Sensor Status registers*.

Primary and Secondary Sensor Status Holding Registers

The following values are for the Primary and Secondary Sensor Status holding registers. If the Transmitter does not contain the Output option, then the second two values do not pertain.

	Primary (& Secondary) Sensor Status	
Value	**Input Switch 1 (or 2)**	**Output Switch 1 (or 2)**
0.0	Open	Open
1.0	Closed	Open
2.0	Open	Closed
3.0	Closed	Closed

5. Maintaining the Transmitter

Warning! Explosions may result in death or serious injury. Do not remove the instrument cover or open wiring housing in explosive atmospheres when power and communications are on. Instead, remove the Transmitter from the hazardous location and then proceed to open the instrument cover and replace the battery.

The Switch Input Transmitter is extremely easy to maintain in that it requires no periodic calibration or system checks. The Transmitter has a self-diagnostic that is constantly checking the internal system. If any errors are found, they are reported via the LCD, Base Radio, or WMT. A simple yearly visual inspection for the following is all that is needed:

- Is the Transmitter still securely fastened to the equipment being monitored?
- Are there any visible corrosions, cracks or residue build-ups on the unit?
- Has anything about the application changed from the original intended use?

5.1. Changing the Battery

The battery will need to be changed within one month of seeing a 'LOW BAT' message on the Transmitter. This is a simple process:

[1] Make sure you have the correct replacement battery:

Lithium Inorganic Battery (non-rechargeable)
Size "C" – 3.6Volts
- Tadiran TL-2200
- Tadiran TL-5920
- Tadiran GmbH SL-2770

[2] Power down the Transmitter by pressing and holding both the NEXT and ENTER buttons for a few seconds and then entering the password.

[3] Remove the 4 set screws on the sides of the Transmitter housing with a standard screwdriver.

[4] Remove the housing and locate the battery.

Warning! The replacement battery MUST be a Lithium Inorganic Battery (non-rechargeable). Size C—3.6Volts, Tadiran TL-2200, Tadiran TL-5920, Tadiran GmbH SL-2770.
Use of a different battery will VOID the intrinsic safety rating of this device and may result in an explosion!

Warning! When removing the housing do not twist or bend the green flex cable! Doing so may cause the tether to improperly seat next to the antenna and greatly reduce operable RF distances. Do not allow the housing to flop around while hanging by the tether.

[5] Remove the old battery and replace it with the new battery, positive end first.

Note *The positive end of the battery clip is the end with the red wire. Putting the battery in backwards will blow a fuse.*

[6] Replace the housing and screw the housing back on. Power up the unit by pressing and holding both the NEXT and ENTER buttons for a few seconds.

[7] Properly dispose of the used battery.

6. Technical Specifications

6.1. WW591, WW592

RF Characteristics

- 869.4 MHz – 869.65 MHz Frequency Hopping Spread Spectrum
- Up to 600 m (2000 ft) range from Base Radio with clear line of sight; 150 m to 300 m (500 ft to 1000 ft) range with obstructions
- The RF module in each Transmitter is individually tested and calibrated over the full temperature range to ensure reliable wireless operation

Operating Temperature Range

- -40°F to +185°F (-40°C to +85°C) electronics
- -4°F to +158°F (-20°C to +70°C) display (full visibility)
- -4°F to +158°F (-20°C to +70°C) display (with reduced visibility)

Physical Characteristics

- Aluminum junction box
- GE Lexan® cover. V-0 rating and UV stable

Operating Vibration and Shock Characteristics

- Certified per IEC EN00068 2 -6 (vibration) and 2-27 (shock)

Random Vibration Characteristics

- Certified to withstand 6 g's, 15 minutes per Axis from 9 – 500 Hz

Electromagnetic Compatibility (CE Compliance)

- Operates within specification in fields from 80 to 1,000 MHz with Field strengths to 30 V/m. Meets EN 50082-1 general immunity standard and EN 55011 compatibility emissions standard

CE Conformity

- These models are in conformity with the protection requirements of European Council Directives: 89/336/EEC, the EMC Directive, and 1999/5/EC, the Telecommunications Directive in accordance with EN 300 220-3-2000, EN 300 489-1-2005, EN 300 489-3-2002, and EN 61326-1997+A1+A2. Conformity of this product with any other "CE Mark" Directive(s) shall not be assumed.

ATEX Certifications

- Intrinsically Safe, Zone 0/1: Ex II 1 G EEx ia IIC T4 (Ta = -40°C to +65°C) IP65
- Non-Sparking, Zone 2: Ex II 3 G EEx nA, IIC T6 (Ta = -40°C to +85°C) IP65

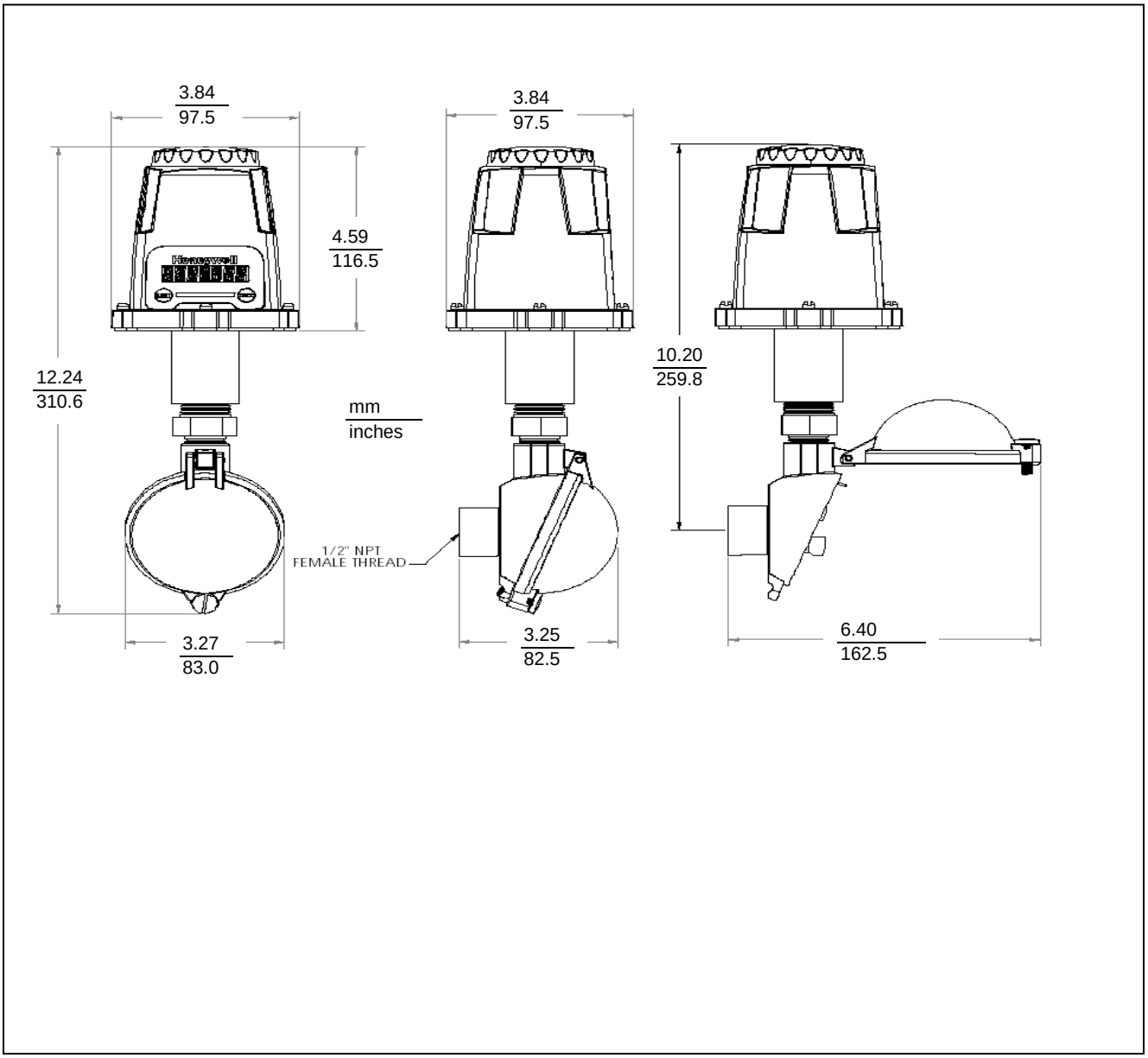


Figure 6-1: Dimensioned Mechanical Drawing

7. Appendix A: Opening the Configuration box in WMT

In WMT, go to the Transmitter View. This view shows the Transmitter information, and allows you to configure and view individual Transmitter data. This view can be accessed at any time by clicking on the Transmitters icon in the Views pane. The Transmitter View is shown below. More information is found in Sections 8 and 9 of the WMT User Guide.

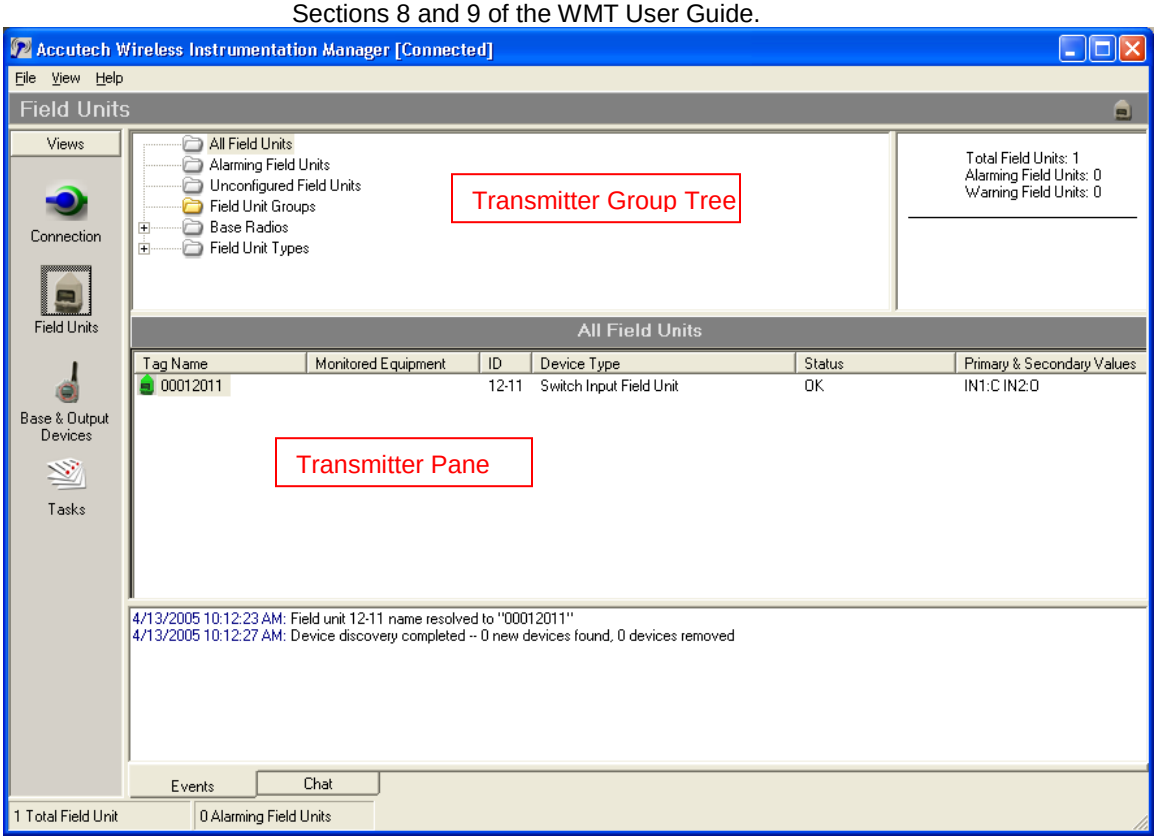
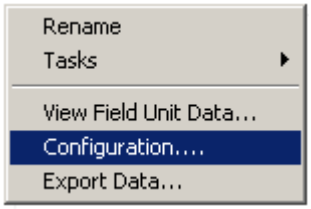


Figure A- 1: WMT with All Transmitters view

The Transmitters are displayed in the Transmitter Pane based on the selection in the Transmitter Group Tree.

To open the Configuration dialog box, right mouse click a Transmitter and select Configuration from the Right Mouse Button menu:



8. Appendix B: Transmitter Displayed Message Definitions

This section covers the various messages, displayed on the Transmitter LCD, that occur during operation of the device.

Operations Sequence

- **RF Link Status**
  - ⇒ **RF OK** – Transmitter and Base Radio are communicating properly
  - ⇒ **RF SYNC** – Transmitter and Base Radio are attempting to synchronize communications.
  - ⇒ **RF OFF** – Transmitter's RF Channel is set to RF OFF
  - ⇒ **NO RF** – Transmitter and Base Radio have no communications
- **Switch Input**
  - ⇒ **S1/S2 OPEN** – Open
  - ⇒ **S1/S2 CLSD** – Closed
  - ⇒ **S1/S2 N-A** – Not Available

Error Messages
If an error is detected with the operation of the Transmitter a message will be displayed on the Transmitter LCD (a corresponding message may also appear on the Base Radio LCD).

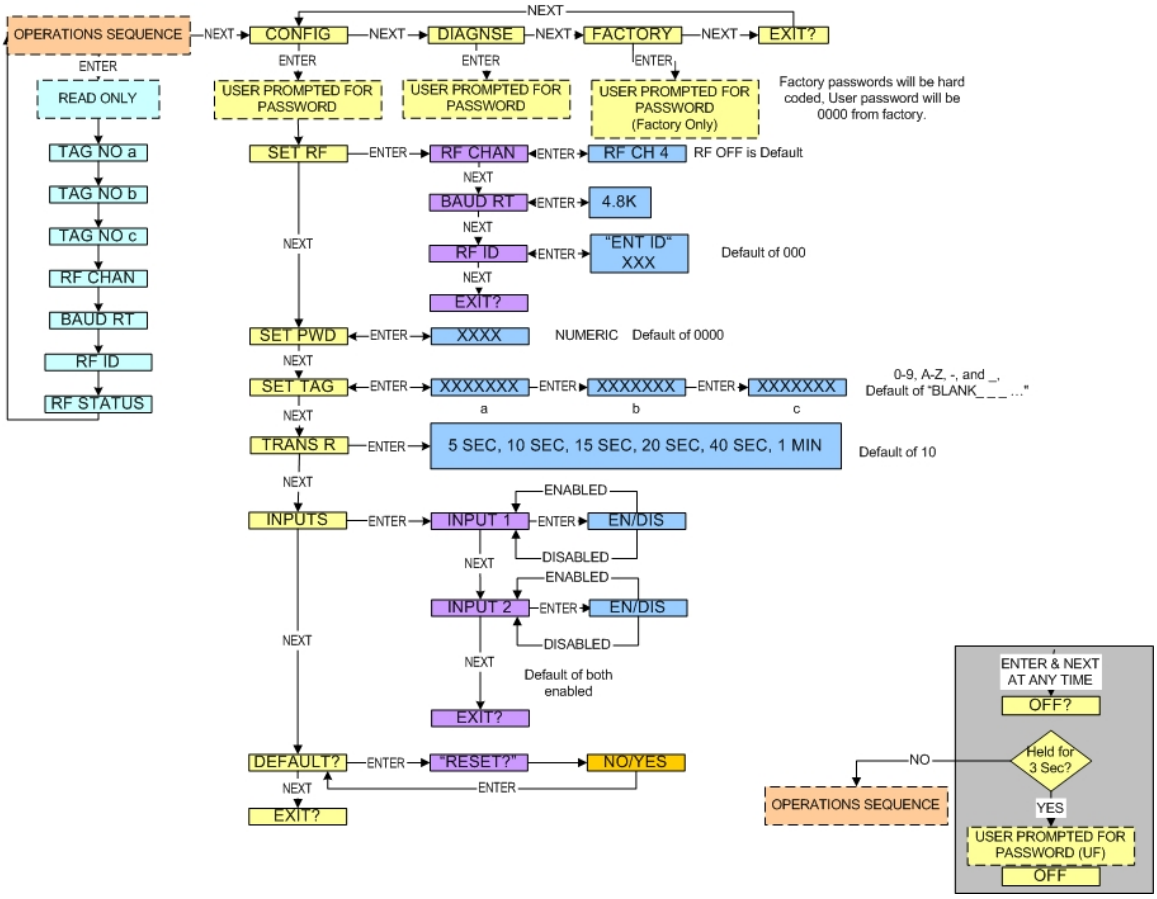
There are two types of error messages, warning and fatal. Warning messages are displayed as part of the normal cycling message sequence. These are:

- **LOW BAT** - battery should be replaced as soon as possible
- **NO RF** - can not detect Base Radio

Fatal error messages will replace the normal cycling message sequence and will flash. A fatal message indicates the Transmitter is no longer operating normally and requires repair. These are:

- **RF ERR -** fatal error within RF communications
- **SEN ERR -** fatal error within the sensor electronics
- **SYS ERR -** fatal error within the microprocessor system
- **RF CAL -** fatal error within the RF calibration system

9. Appendix C: Transmitter Menu Map



Transmitter Menu Map

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34-XY-25-63
July 2012
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